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Abdominal Cocoon Syndrome Complicated With Appendicitis and Intestinal Obstruction: A Rare Case Report

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Literature Search F

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Phone: (+86)18050401635, e-mail: 1056217076@qq.com**Financial support:**

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Conflict of interest:

None declared

Patient: Female, 55-year-old**Final Diagnosis:** Abdominal cocoon syndrome**Symptoms:** Abdominal pain • abdominal distension • nausea • vomiting**Clinical Procedure:** —**Specialty:** Surgery**Objective:** Rare disease**Background:** Abdominal cocoon syndrome (ACS) is a rare benign peritoneal fibrotic disorder defined by partial or complete small-bowel encasement within dense fibrocollagenous membranes, often causing recurrent episodes of small-bowel obstruction. Nonspecific clinical manifestations and the absence of specific serological or imaging biomarkers frequently lead to clinical misdiagnosis, delayed preoperative recognition, and suboptimal early intervention. The concurrent presentation of idiopathic ACS, acute appendicitis, and mechanical small-bowel obstruction is extremely rare. This atypical triple pathology significantly complicates clinical assessment and hinders timely definitive diagnosis in routine practice.**Case Report:** A 55-year-old woman presented with 20 years of unexplained intermittent abdominal pain, with acute symptomatic worsening over 3 days associated with marked abdominal distension, nausea, and vomiting. Multiple previous conservative therapies failed to establish a clear etiology or achieve sustained symptom relief. Emergency abdominal computed tomography (CT) confirmed mechanical small-bowel obstruction and appendiceal fecaliths. Standard in-hospital conservative treatment yielded no obvious clinical improvement. Emergency laparoscopy confirmed diffuse peritoneal fibrosis, complete small-bowel fibrous encapsulation, and concomitant acute appendicitis. Laparoscopic partial fibrous membrane release combined with appendectomy was successfully performed. The patient achieved rapid recovery of gastrointestinal function, with no recurrent abdominal pain or intestinal obstruction during 6-month clinical follow-up.**Conclusions:** ACS should be highly suspected in patients with over 10 years of idiopathic recurrent abdominal pain and no prior abdominal surgery or trauma. Contrast-enhanced abdominal CT serves as a reliable noninvasive screening tool. This rare triple-lesion combination progresses rapidly and requires prompt surgical intervention. Emergency laparoscopy allows simultaneous definitive diagnosis and targeted therapy, and meticulous fibrous membrane release helps reduce disease recurrence and optimize long-term patient prognosis.**Keywords:** Case Reports • Missed Diagnosis**Full-text PDF:** <https://www.amjcaserep.com/abstract/index/idArt/954562>

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Introduction

Abdominal cocoon syndrome (ACS), also known as sclerosing encapsulating peritonitis, is a rare benign peritoneal lesion [1]. Foo et al [2] first systematically described this clinical entity and coined the term “abdominal cocoon” in 1978. Its core pathological feature is the complete encapsulation of the small intestine within the abdominal cavity by a dense, avascular gray-white fibrous membrane. The incidence of this disease is low. In its early stages, the disease manifests only as nonspecific recurrent abdominal pain and abdominal distension without typical laboratory or imaging findings, leading to a high rate of clinical misdiagnosis and missed diagnosis. Most patients with ACS present with intestinal obstruction alone, whereas cases concurrently involving all 3 lesions—including acute appendicitis and mechanical intestinal obstruction—are exceedingly rare in clinical practice.

This case report focuses on the surgical management of ACS combined with acute abdomen, with the primary objective of summarizing standardized diagnostic and therapeutic strategies for this complex clinical condition. Furthermore, it enriches the clinical data of ASC complicated by dual acute abdominal lesions and provides practical diagnostic and therapeutic evidence to support the clinical management of similar intractable cases.

Case Report

A 55-year-old woman was admitted on January 25, 2026, at 06:50 AM with a chief concern of “recurrent lower abdominal pain for over 20 years, aggravated with vomiting lasting 3 hours.” She had no history of abdominal surgery, abdominal trauma, pulmonary tuberculosis, chronic gastrointestinal diseases, or familial genetic predisposition to abdominal disorders. Over 20 years prior, the patient had experienced recurrent paroxysmal abdominal pain without obvious triggers, predominantly localized to the periumbilical and lower abdominal regions, without fixed tender points or accompanying symptoms such as persistent high fever, chills, or hematochezia. During episodes of abdominal pain, multiple examinations—including abdominal radiographs, conventional abdominal computed tomography (CT) scans, and gastroscopy/colonoscopy—were performed at other institutions, yet no definitive organic lesions were identified. The condition had long been diagnosed as a functional gastrointestinal disorder or primary intestinal adhesions; conservative treatments such as gastrointestinal decompression, antispasmodic analgesics, and anti-infective therapy provided transient relief, but the abdominal pain recurred repeatedly without a clear underlying etiology. Three hours before admission, the patient’s abdominal pain suddenly worsened, becoming persistent and accompanied by progressive

abdominal distension, recurrent vomiting of gastric contents, and cessation of defecation and flatus.

On admission, vital signs were as follows: temperature, 36.6 °C; pulse, 72 beats/min; respiration, 20 breaths/min; and blood pressure, 132/82 mm Hg. Physical examination revealed abdominal distension with generalized tenderness, most pronounced in the right lower quadrant, accompanied by suspected rebound tenderness and abdominal guarding; bowel sounds were diminished, and no significant abdominal mass was palpable. Emergency laboratory test results revealed the following: complete blood count showed a white blood cell count of $6.39 \times 10^9/L$ and a neutrophil percentage of 63.10%; C-reactive protein was < 0.50 mg/L, with no significant elevation in inflammatory markers; and liver and kidney function, electrolytes, serum amylase, and lipase levels were all within the reference ranges. Emergency abdominopelvic CT demonstrated an enlarged appendix with fecalith impaction and clustered and dilated small-bowel loops with fluid accumulation surrounded by fibrous membrane. Combined with clinical findings, these imaging features were highly suggestive of intestinal obstruction complicated by acute appendicitis (**Figure 1**).

Upon admission, the patient was placed on nil per os, received continuous gastrointestinal decompression, and was administered parenteral nutritional support. As there was no significant improvement in the patient’s condition, preoperative emergency preparations were completed; after ruling out absolute surgical contraindications and obtaining consent from the patient’s family, an emergency laparoscopic exploration under general anesthesia was performed. Intraoperative findings revealed a complete gray-white, dense fibrous capsule surrounding the entire small intestine, forming a typical cocoon-like structure. The fibrous membrane compressed the intestinal tract, causing partial stenosis, with marked dilation and fluid accumulation in the proximal small intestine (**Figure 2**). The appendix exhibited congestion and edema, covered with purulent exudate, confirming acute appendicitis (**Figure 3**); no intestinal necrosis, perforation, or abdominal tuberculosis lesions were observed. Given the extensive intra-abdominal adhesions that precluded complete separation of the adherent bowel wall, a limited release procedure was performed following damage-control principles. The fibrous capsule enveloping the small intestine was meticulously dissected layer by layer to completely release the adhesions and restore normal peristaltic function. Subsequently, a conventional appendectomy was performed with placement of 1 abdominal drainage tube, and the surgery was completed uneventfully.

Postoperative management included anti-infective therapy, gastrointestinal decompression, fluid replacement to maintain water and electrolyte balance, and nutritional support. On the second postoperative day, the patient resumed passage

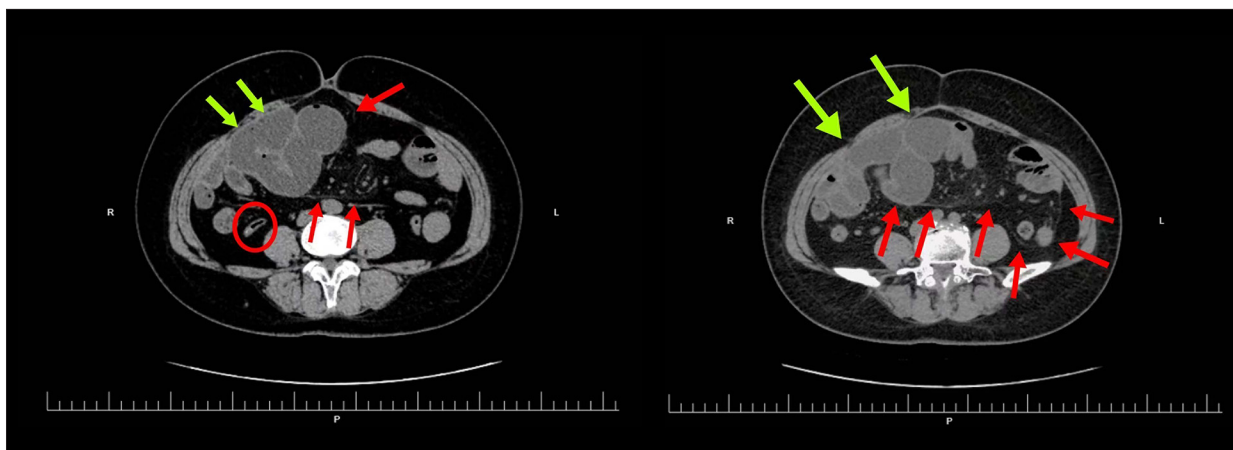


Figure 1. Findings on emergency abdominal computed tomography at admission. The red arrow indicates the fibrous membrane; green arrow shows the “small intestinal cluster sign”; and red circle represents the appendix, gas accumulation, and fecal calculi are visible within the lumen.

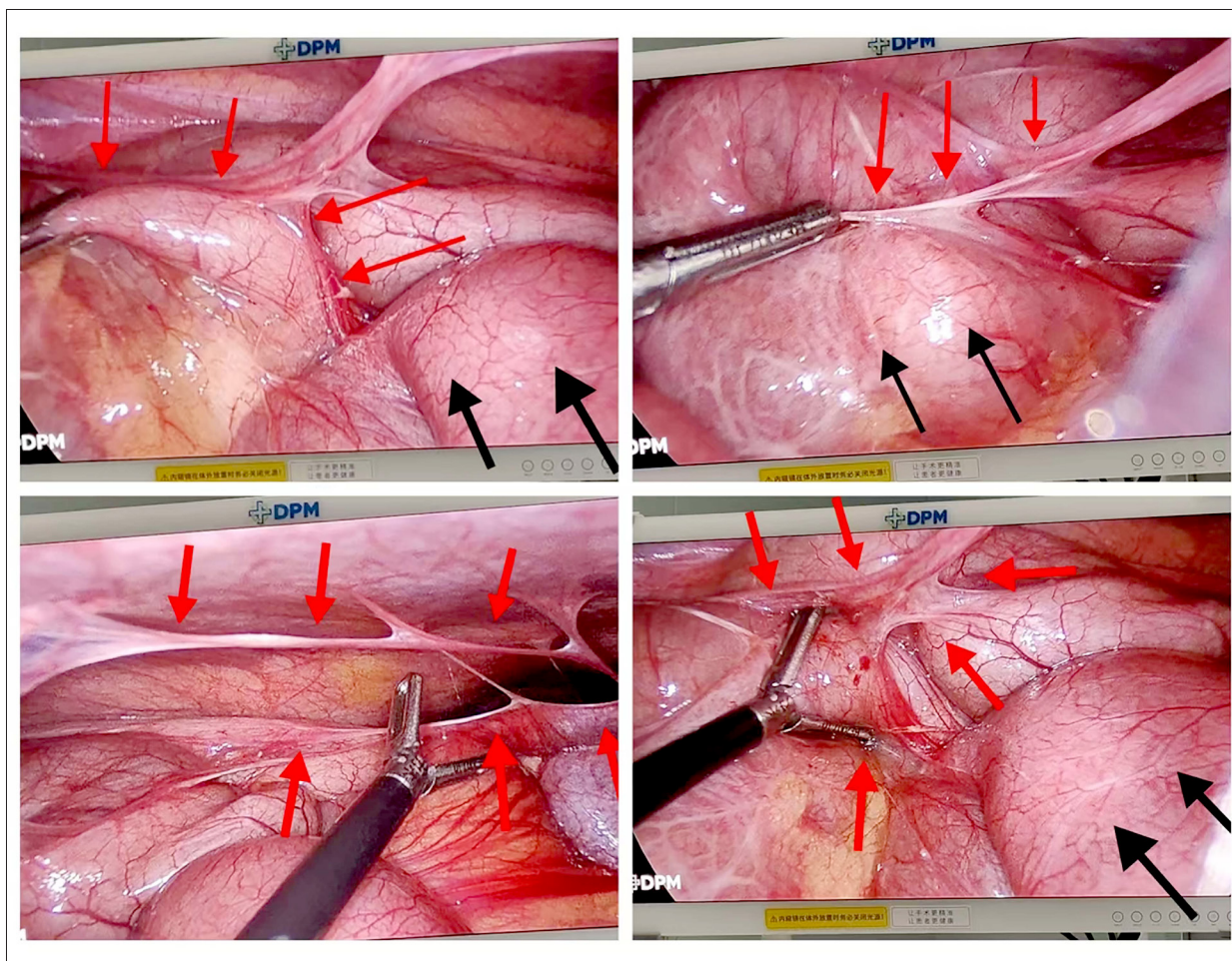


Figure 2. Intraoperative findings during emergency admission. The white fibrous membrane is indicated by the red arrow, and the proximally dilated obstructed bowel segment is indicated by the black arrow.



Figure 3. Findings of the surgical specimen: appendicitis with congestion and edema, covered with purulent exudate on the surface.

of flatus, with abdominal pain and distension completely resolved. Follow-up abdominal CT showed significant improvement in intestinal dilation and fluid accumulation in the lower abdomen and pelvis compared with preoperative findings (**Figure 4**), allowing gradual transition to a liquid diet. The abdominal drainage tube was removed on the third postoperative day, and by the fourth day, the wound had healed well, enabling discharge. At the 6-month follow-up, the patient reported no abdominal pain, distension, nausea, or vomiting, with complete restoration of normal eating habits and bowel function.

Discussion

Abdominal cocoon syndrome (ACS), also known as encapsulating peritoneal fibrosis, is a rare form of peritoneal fibrosis

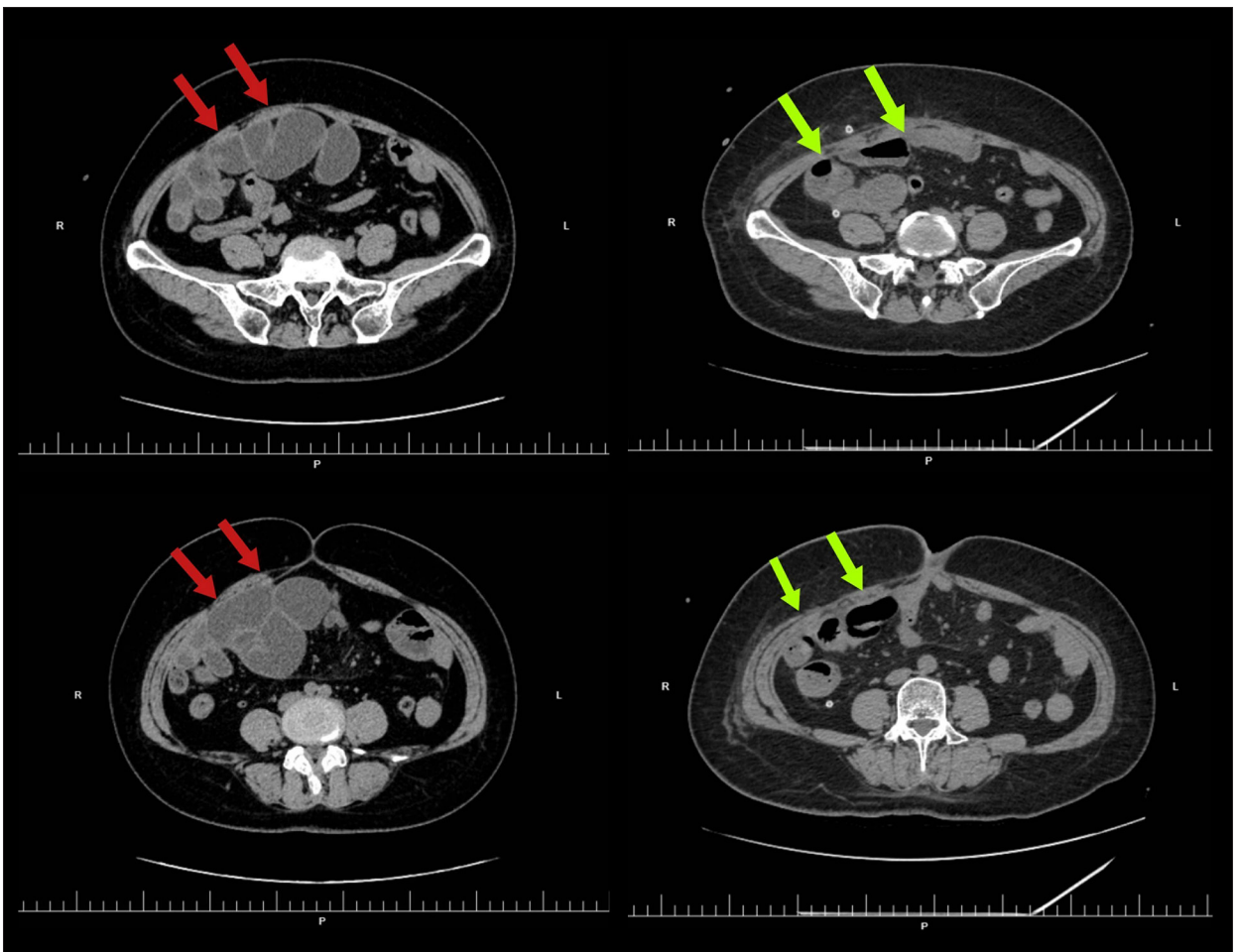


Figure 4. Computed tomography imaging findings before surgery and on the second postoperative day. The red arrows in the upper-left and lower-left images indicate preoperatively dilated small bowel in the lower abdomen and pelvic cavity; green arrows in the upper-right and lower-right images show corresponding intestinal changes after surgery.

characterized by complete or partial encapsulation of the small intestine by a dense collagen-rich membrane, which predisposes patients to recurrent subacute or complete intestinal obstruction and carries a high preoperative misdiagnosis rate [3]. It is classified into idiopathic and secondary subtypes according to etiology. Idiopathic ACS predominantly affects adolescent girls in tropical and subtropical regions and has been associated with embryonic peritoneal developmental defects or retrograde subclinical peritonitis of the reproductive tract. Secondary ACS occurs in patients with long-term peritoneal dialysis, abdominal tuberculosis, abdominal chemotherapy, or IgG4-related peritoneal diseases. The “secondary-injury” fibrotic mechanism is widely acknowledged, and TGF- β -driven hyperproliferation of peritoneal fibroblasts represents its key pathological feature [4]. Preoperative contrast-enhanced CT can identify the encapsular sign and small-bowel cluster sign for screening, although these findings lack diagnostic specificity; definitive diagnosis is predominantly achieved through intraoperative visualization of the fibrous cocoon membrane. Conservative nutritional support is indicated for asymptomatic mild cases. For recurrent obstruction or intestinal ischemia, standard surgery consists of fibrous membrane excision combined with careful intestinal release, and intestinal resection is reserved for frankly necrotic bowel segments. Standardized surgical management lowers recurrence rates [5]. Clinicians must distinguish ACS from tuberculous peritonitis, mesenteric torsion, paraduodenal hernia, and congenital peritoneal encapsulation to avoid misdiagnosis and delayed operative intervention [6].

This case describes an idiopathic ACS presenting with concomitant mechanical small-bowel obstruction and acute appendicitis. The added value of this case report lies in 3 aspects: it illustrates real-world diagnostic barriers in long-term undiagnosed ACS, summarizes subtle preoperative clues that raise clinical suspicion for ACS, and provides observational evidence for emergency surgical management of ACS complicated by 2 concurrent acute intra-abdominal pathologies. Because this is a single-case observation, its findings should be regarded as case-specific references rather than generalizable clinical practice guidelines.

This patient’s 20-year history of misdiagnosis exemplifies the diagnostic challenges of ACS in the preoperative setting. Danford [7] estimated its population-level incidence at approximately 1 per million. ACS lacks validated specific diagnostic criteria, characteristic physical findings, and serological biomarkers [8]. Most affected patients have no prior abdominal surgery or trauma, which further obscures the etiology. In the present case, the clinical picture of nausea, vomiting, abdominal distension, obstipation, progressive abdominal pain, marked right-lower-quadrant tenderness, suspected rebound tenderness, abdominal guarding, and decreased bowel sounds,

together with preoperative CT showing an appendix with fecal calculi and partial small-bowel dilatation with effusion, strongly suggested intestinal obstruction combined with acute appendicitis. Laparoscopy demonstrated an absent greater omentum and complete silkworm-cocoon-like fibrous entrapment of the small intestine, confirming ACS. For patients with persistent unexplained recurrent abdominal pain, enhanced CT with coronal-sagittal reconstruction may serve as an auxiliary diagnostic modality [9].

Retrospective review of this patient’s prolonged clinical course reveals several underrecognized clinical clues that might have triggered earlier suspicion of ACS: recurrent unexplained abdominal distension and colic without identifiable organic gastrointestinal disease, intermittent incomplete small-bowel air-fluid levels on cross-sectional imaging, and absence of typical risk factors for adhesive small-bowel obstruction. These non-specific findings cannot establish the diagnosis independently, yet they should alert clinicians to include ACS in the differential diagnosis when routine workup fails to explain persistent abdominal discomfort.

Mechanical small-bowel obstruction is the predominant complication of ACS, caused by fibrocollagenous capsules that constrain bowel loops, impair peristalsis, and narrow the intestinal lumen. Co-occurrence of ACS and acute appendicitis is uncommon. Ye et al and Chorti et al [10,11] proposed a reciprocal vicious-cycle mechanism: the fibrous capsule produces stasis that elevates intraluminal appendiceal pressure and promotes bacterial overgrowth and infection. In turn, inflammatory exudates from acute appendicitis activate peritoneal fibroblasts via TGF- β signaling, augment collagen deposition and peritoneal fibrosis–adhesion, and worsen intestinal obstruction. This inflammatory-fibrotic cascade supports timely surgical exploration when patients demonstrate clinical deterioration and obstructive features, as seen in the present acute presentation.

Management of ACS includes conservative and surgical strategies. Conservative measures involve fasting, gastrointestinal decompression, and parenteral nutritional support. Li et al [12] proposed a clinical classification system based on capsule thickness, secondary peritoneal cavity formation, and symptom severity to guide treatment selection. In our patient with combined obstructive and suppurative intra-abdominal disease, conservative measures failed to halt progressive abdominal deterioration, illustrating the limitations of non-operative care in this particular clinical scenario. When adequate conservative therapy fails and obstruction persists, most experts [13] recommend emergency exploratory surgery. This patient underwent emergency laparoscopy with local capsular incision and decompression to release the entrapped small bowel, along with appendectomy. Manipulation of edematous bowel was

minimized to avoid iatrogenic injury. The patient regained flatus and ambulation within 48 hours, tolerated advancing oral intake, showed marked resolution of obstruction on CT on postoperative day 3, and was discharged on postoperative day 4.

Conclusions

ACS is a rare peritoneal disease with atypical clinical and imaging features, easily resulting in long-term missed and delayed diagnosis. This case describes an extremely rare clinical phenotype of idiopathic ACS concurrent with mechanical intestinal obstruction and acute appendicitis, which has been scarcely described in previous literature. The present study summarizes core clinical insights based on this single progressive case, and all observational findings are case-specific rather than universal clinical guidelines.

This patient's 20-year diagnostic delay further confirms that the rarity of ACS, lack of specific serological markers, and inconspicuous early imaging manifestations constitute major diagnostic obstacles. For patients with long-standing unexplained recurrent abdominal pain and no history of abdominal surgery or trauma, contrast-enhanced abdominal CT with multiplanar reconstruction is a valuable screening tool for early ACS suspicion. Retrospectively, recurrent cryptogenic abdominal pain and intermittent incomplete intestinal obstruction without adhesive risk factors are critical subtle clinical clues that facilitate the differential diagnosis of ACS.

In complex ACS cases combined with acute abdominal lesions, conservative treatment may fail to control progressive abdominal deterioration. Once inflammatory and obstructive symptoms worsen, timely surgical exploration is clinically necessary. This patient achieved satisfactory symptomatic resolution via emergency laparoscopic local capsular decompression combined with appendectomy. Although complete capsule resection is associated with favorable long-term prognosis in previous studies, this single case cannot verify its superiority over partial decompression surgery [14].

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Clinicians should maintain a high index of suspicion for ACS and adapt diagnostic strategies accordingly when evaluating unexplained chronic abdominal pain. For emergency scenarios with overlapping acute abdominal lesions, damage-control surgical principles are recommended: localized capsular release effectively relieves intestinal entrapment while avoiding excessive dissection and intraoperative visceral injury, which balances emergency symptom relief and surgical safety.

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Ethics and Patient Consent Statement

Written informed consent was obtained from the patient for publication of this case report and any accompanying clinical images. The patient fully understood the purpose of data collection and manuscript publication, and agreed to anonymized presentation of all clinical data to protect personal privacy. All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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